

REMARKS

The above amendment amends the specification to correct errors and improve clarity. No new matter is added.

The Examiner objected to the specification. In response, Applicant has amended the specification to correct errors as follows.

Paragraph [0050] is amended to correct the error on page 13, line 15 by replacing probe tip “630” with probe tip “620” as the Examiner suggested.

The reference number 740 remains in paragraph [0052] since vias 740 are shown in the lower right-hand portion of Fig. 7A.

Paragraphs [0063], [0064], and [0065] are amended for consistency with Fig. 9D and particularly to change device “915” to device “912”, which is shown in Fig. 9D.

In view of the above amendments, Applicant requests reconsideration and withdrawal of the objection to the specification.

Claims 1-17 were pending in the above-identified application when last examined and are amended as indicated above. The claim amendments clarify the claim language and are not intended to limit the scope of the claims, unless the claim language is expressly quoted in the following remarks to distinguish over the art cited.

Claims 1-10 and 13-17 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Pat. No. 6,621,710 (Cheng) in view of U.S. Pat. No. 5,804,983 (Nakajima). Claim 14 is canceled as redundant in view of the amendment of claim 13. Applicant respectfully traverses the rejection of claims 1-10, 13, and 15-17.

Independent claim 1 distinguishes over the combination of Cheng and Nakajima at least by reciting, “a probe comprising a semiconductor die and probe tips on the semiconductor die, wherein the probe tips comprise bumps that are arranged in a pattern that matches a pattern of terminals on the device and that directly contact the terminals during testing of the device.”

Cheng and Nakajima when considered in combination or separately fail to suggest a probe including semiconductor die with bumps that contact the terminals of a device being tested. In particular, Cheng discloses a system using probe needles. For example, beginning

at column 2, line 45, Cheng states, “As shown in FIG. 2, the silicon substrate 220 has a first surface 221 and a second surface 222, wherein probe needles 223 are arranged on the first surface 221 to contact the wafer 300 under test.” Nakajima discloses a system using cantilevered probes. For example, in describing Figs. 3 and 4, Nakajima beginning at column 5, line 58 states, “A plurality of probes 23 are tilted downward from both sides of the center opening of the card body 24.” The conventional probes and needles of Cheng and Nakajima fail to suggest a probe using bumps.

In accordance with an aspect of Applicant’s invention, a probe structure manufactured using the same fabrication techniques as used to manufacture the device being tested can match the size limitations set by the device. Probe tips using bumps, for example, can be fabricated at the fine pitches that are possible through known wafer bumping processes, and the bump spacing is likely to scale down in size as semiconductor fabrication techniques improve. In contrast, Cheng and Nakajima disclose probe needles without indicating how or whether the fabrication techniques for such probe needles can keep pace with the miniaturization of semiconductor devices. Accordingly, claim 1 is patentable over Cheng and Nakajima.

Claims 2-10 depend from claim 1 and are patentable over Cheng and Nakajima for at least the same reasons that claim 1 is patentable over Cheng and Nakajima.

Independent claim 13 distinguishes over the combination of Cheng and Nakajima at least by reciting, “forming probe tips on a semiconductor die in a pattern matching a pattern of terminals on the semiconductor device, wherein forming the probe tips comprises ... forming conductive bumps on a surface of the contact pads.” As noted above, Cheng and Nakajima fail to suggest forming probe tips by forming bumps because Cheng and Nakajima only disclose more conventional probe needles. Accordingly, claim 13 is patentable over Cheng and Nakajima.

Claims 15-17 depend from claim 13 and are patentable over Cheng and Nakajima for at least the same reasons that claim 13 is patentable over Cheng and Nakajima.

For the above reasons, Applicant requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 103.

Claim 11 was rejected under 35 U.S.C. § 102(b) as anticipated by Nakajima. Claim 11 is canceled.

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Claim 12 was rejected under 35 U.S.C. § 103(a) as unpatentable over Nakajima in view of Cheng. Claim 12 is canceled.

Claims 18-33 are added. New claims 18-28 depend from claim 13 and are patentable for at least the same reasons that claim 13 is patentable. New claims 29-33 depend from claim 1 and are patentable for at least the same reasons that claim 1 is patentable.

In summary, claims 1-17 were pending in the application. This response amends claims 1 and 13, cancels claims 11, 12, and 14, and adds claims 18-33. For the above reasons, Applicant respectfully requests allowance of the application including claims 1-10, 13, and 15-33.

Please contact the undersigned attorney at (408) 927-6700 if there are any questions concerning the application or this document.

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Respectfully submitted,



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